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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,138	10/10/2001	Neal M. Muylaert	BOEI-1-1006	8881

25315 7590 07/02/2004

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EXAMINER

COMPTON, ERIC B

ART UNIT	PAPER NUMBER
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3726

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/975,138

Applicant(s)

MUYLAERT, NEAL M.

Examiner

Eric B. Compton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 22 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(f) he did not himself invent the subject matter sought to be patented.

2. Claims 1-20 are provisionally rejected under 35 U.S.C. 102(f) because it appears that the applicant did not solely invent the claimed subject matter.

Applicant discloses, "This application incorporates by reference co-pending application titled "Opposing Conical Elastomeric Bearing Assembly," ***invented by Robert T. Loftus***, attorney docket number BOEI-1-1005." Specification, Page 1, lines 16-19 (emphasis added). The above co-pending application has been published Patent Application Publication US 2003/0068104 (cited in PTO Form 982 attached). The Examiner has reviewed the above publication, which is directed to the same essential subject matter claimed, i.e., a bearing assembly. See US 2003/0068104, Figures 4-6.

The method of forming the bearing is implicit for the disclosure of Loftus. See MPEP § 2144.01. "[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). Based on above evidence, it appears that the two inventors were joint inventors of the present invention. However, Applicant filed this patent application, as the sole named inventor.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view either of U.S. Patent 3,989,126 to Katzer, U.S. Patent 4,772,151 to Lammers et al ("Lammers"), or U.S. Patent 5,286,132 to Morini.

Applicant discloses, "This application incorporates by reference co-pending application titled "Opposing Conical Elastomeric Bearing Assembly," invented by Robert T. Loftus, attorney docket number BOEI-1-1005." Specification, Page 1, lines 16-19. The above co-pending application has been published Patent Application Publication US 2003/0068104 to Loftus (cited in PTO Form 982 attached). Thus, this co-pending reference is considered to be apart to the present application. See MPEP § 2163.07.

US 2003/0068104 discloses, as prior art:

Elastomeric conical bearings are commonly used in bearing assemblies for helicopter rotor systems to accommodate rotor motion. The bearing assemblies are axially preloaded to prevent the conical bearing elements from experiencing a resultant tensional load. Currently, mono-directional bearing elements are employed at each attachment site of the main rotor hub. **FIG. 1 depicts a view of a prior art articulated hub assembly 20a.** The hub assembly 20a includes a tire bar 26 connected to a hub center body 22. The tie bar 26 is connected to the center body 22 in a similar manner as disclosed in FIG. 1, however, the bearing assembly 30a is substantially different. The bearing assembly 30 includes a pair of conical bearing elements 52 contacting the journal 28 on the bearing's inner

surface 52 and the outer bearing surface is contained within an outer housing 42a. Each bearing element is a mono-directional single conical taper bearing having an elastomeric element 54 contained within. The conical bearings are arranged such that the apex of the conical elements extends radially outward from one another. The bearing arrangement yields a force couple that extends from one bearing to the other. The force couple yields a bearing pre-load path 43 extending through the hub center body 22.

Section [0004] (emphasis added). When applicant states that something is prior art, it is taken as being available as prior art against the claims. Admitted prior art can be used in obviousness rejections. *In re Nomiya*, 509 F.2d 566, 184 USPQ 607, 610 (CCPA 1975) (Figures in the application labeled “prior art” held to be an admission that what was pictured was prior art relative to applicant's invention.).

AAPA discloses generally a conical bearing assembly including an outer housing (50) configured with a plurality of mounting flanges for attachment to the hub center body (22); and a conical elastomeric bearing element (54) having an inner race (52), configured to receive the tie bar journal section (28a) of the rotor assembly. See US 2003/0068104, Figure 1. The steps of forming the bearing are inherently required.

However, AAPA does not disclose providing a preloaded opposing conical bearing assembly in the rotary hub assembly.

Katzer discloses a method of forming a preloaded opposing conical bearing assembly having a preloaded opposing conical bearing assembly, having the same general structural configuration as Applicant's bearing assembly. *Compare* Figure 1 of Katzer with Figure 3 of Applicant. “[A]fter assembly and mounting of the pivot joint the tightened forces of the assembled joint will totally bear upon the rubber sleeves and will not be transferred in any part to the outer surfaces of the trunion bearings 14 and 15 [of

the vehicle frame]. Cols. 3-4, lines 50-2. This is nearly identical to the motivation for Applicant to use a preloaded opposing conical bearing assembly, i.e., to eliminate of preload forces on hub body. See Specification, page 2, lines 13-14 & 32-33.

Lammers discloses a method of forming a preloaded opposing conical bearing assembly having a preloaded opposing conical bearing assembly, having the same general structural configuration as Applicant's bearing assembly. *Compare* Figure 1 or Lammers with Figure 3 of Applicant. "The dual tapered, elastomeric preloaded bearings restrain and capture the relatively moveable member axially and radially without a thrust bearing." Abstract. "The elastomeric bearings 18 and 20 also serve as isolation barriers between the frame 14 and the shaft 12 to reduce transfer or amplification of noise and vibration between these two members. Col. 3, lines 49-53.

Morini discloses a method of forming a preloaded opposing conical bearing assembly having a preloaded opposing conical bearing assembly, having the same general structural configuration as Applicant's bearing assembly. *Compare* Figure 1 or Morini with Figure 3 of Applicant. Morini disclose " a "object to the invention is to provide biconical swivels which, in addition to a high hunting strength, having a high radial stiffness together with a uniform distribution of stress on the elastomeric material so as to prevent the most stress elastomeric area from giving rise to premature yield due to fatigue." Col. 2, lines 30-36. "In particular, joint 1 can absorb axial stresses, radial stresses and torsion stresses about axis "X" ..." Col. 4, lines 52-53.

Regarding claims 1, 6, and 10, it would have been obvious to one having ordinary skill in the art at the time of invention to have formed the fully articulated rotary

hub assembly for rotary aircraft having preloaded opposing conical bearing assemblies, in light of the teachings of either Katzer, Lammers, or Morini, in order to reduce preload stress on the frame, minimize the oscillations and noise, and provide uniform distribution of stress on the bearing.

Regarding claim 11, AAPA discloses that it is known that the bearing assemblies are in a preloaded condition. See US 2003/0068104, Figure 1.

Regarding claims 4, 8, and 12, AAPA discloses that the bearing assemblies are in a preloaded condition, but do not disclose the axial pre-loading range between 8,500 and 15,000 lbs. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claims 2, 7, and 13-14, Lammers discloses that the bearing is bonding to the inner and outer races. Col. 2, lines 63-65. Katzer discloses the elastomeric is vulcanized to the housing clearly suggesting adhesive bonding. Col. 2, lines 40-43.

Regarding claims 3 and 15, Katzer suggests bonding the bearing assembly to the inner race by frictional fitting. Col. 2, lines 47-50 ("The outer ends of the rubber sleeves 8 and 9 have the thicker walls and provided with an annular bulge or bead 12 and 132 to function as a support or contact surface.").

Regarding claims 5, 9, 16, and 18, AAPA discloses these particulars regarding the use of a bearing assembly with a rotary assembly.

Regarding claims 17 and 19-20, Lammers shows connecting the bearing elements to each other by placing a plurality of bearing fastener elements, e.g., bolts

(60) extending through the end plates (32) of each inner race. Katzer shows connecting the bearing element to each other with a bolt (22) as well.

Prior Art References

The prior art references listed on the enclosed PTO-892, but not used in a rejection of the claims, are cited for their teachings of forming bearing assemblies.

Response to Arguments

5. Applicant's arguments filed April 22, 2004, have been fully considered but they are not persuasive.

Applicant's drawing corrections have been received and are approved by the Examiner.

It is noted that Applicant's Response did not in any way address the 102(f) rejection noted in the previous Office Action and above. Applicant did comment on AAPA, which is directed to the subject matter at issue though. Response, page 10, second paragraph.

With respect to the 103 rejections Applicant's first argues that "The AAPA includes a single element conical bearing assembly that includes a conical elastomeric bearing element having an inner race." *Id.* Applicant's position is not believed to be correct. As shown in Figure 1 of Patent Application Publication US 2003/0068104, below, the bearing assembly of AAPA includes two conical bearing elements, an inboard bearing element and outboard bearing element, both having an inner race. In

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characterizing AAPA, the Examiner previously stated, "AAPA does not disclose providing a preloaded opposing conical bearing assembly in the rotary hub assembly."

This meant that AAPA did not teach or suggest a rotary hub assembly, wherein the inboard and outboard bearing elements included a preloaded opposed conical bearing assembly.

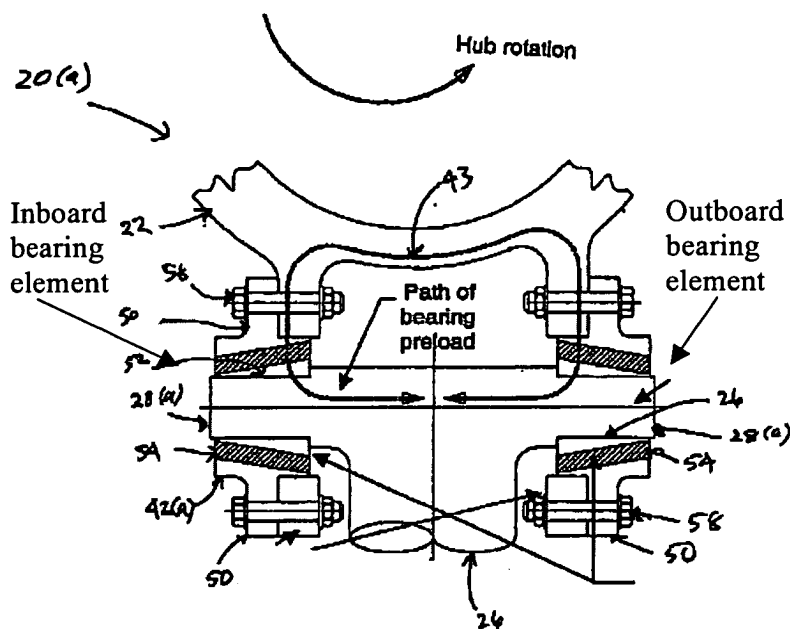


FIG. 1
PRIOR ART

Applicant's characterization of Katzer is correct in that "Katzer discloses a single bushing 5 that also includes a (sic) inner race 6 and 7 (FIGURE 1; col. 2, lines 30-37)." Response, page 10, second paragraph. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re*

Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Therefore, contrary to Applicant's conclusion that "if Katzer were to be combined with the AAPA, the combined device would only include a single bearing element having an inner race wherein the inner race is formed of two conical surfaces 6 and 7 which taper inwardly from outer ends of the bearing element," the combination would in fact teach a device having an inboard bearing element and outboard bearing element, each having two conical tapered surfaces. Each of the conical bearing elements of the inboard and outboard bearing element of AAPA is replaced by the preloaded opposed conical bearing assembly of Katzer, such that when the bearing assembly is "tightened forces of the assembled joint will totally bear upon the rubber sleeves and will not be transferred in any part to the outer surfaces of the trunion bearings 14 and 15 [of the vehicle frame]. Cols. 3-4, lines 50-2.

Applicant's characterization of Lammers et al and Morini are believed to be correct also. However, for the same reasons as pointed out above, with respect to Katzer, Applicant's argument with respect to the combination of AAPA and the particular reference fails.

Katzer, Lammers et al, and Morini all disclose conical bearing assemblies having preloaded opposed conical bearing assembly. By using such a bearing, radial or torsion forces, created by preloading the bearing assembly are canceled out and therefore isolated with respect to the frame. This is precisely the object of the instant invention. See Specification, page 2, lines 13-14 & 32-33.

Therefore, the rejections above are maintained.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (703) 305-0240. The examiner can normally be reached on M-F, 9-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter B. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Eric Compton', with a stylized flourish at the end.

Eric Compton
Patent Examiner
A/U 3726